REMARKS

Claims 3, 6, 17-19 and 23-24 are cancelled.

Claims 1-2, 4-5, and 7-16, 20-22 and 25 are pending.

Claims 1-2, 4-5, and 7-16, 20-22 and 25 are rejected.

'103 Rejection

The office action dated 7 December 2009 indicates that claims 1-2, 4-5, and 7-16, 20-22 and 25 are rejected under 35 USC §103(a). Claims 1, 20 and 25 are base claims. Base claim 1 and its dependent claims 2, 4 and 15 are rejected over Bianchi U.S. Patent No. 6,447,938 in view of Iles U.S. Patent No. 6,951,819, a paper by Wu et al. entitled "Superior radiation resistance in InGaN alloys"), and Sverdrup U.S. Publication No. 20030041894. Base claim 20 and its dependent claims 21-22 are rejected over Iles in view of Wu and Bianchi. Base claim 25 and its dependent claims 5, 7-14 and 16 are rejected over Bianchi in view of Iles and Wu.

Iles is newly cited. Bianchi was made of record by the assignee in an IDS filed June 12, 2007. Bianchi was considered by Examiner Asha Hall on May 31, 2007, but not cited in any claim rejections. The Wu paper was made of record by the assignee in an IDS filed March 6, 2006, asserted in prior rejections of the claims[1], and discussed in the appeal brief filed August 25, 2009.

The Background section of the application describes the use of transparent conductive coatings (TCCS) to improve the efficiency of GaAs solar cells. A TCC can be formed on a transparent substrate, and a GaAs solar cell can be formed on the TCC, thus eliminating the need for a glass cover and glass cover adhesive. The adhesive can darken and thereby reduce efficiency through solar obscuration (paragraph 2).

[1] See the final office action dated Nov. 28, 2007, the third office action dated June 9, 2008 and the second final office action dated Nov. 28, 2008

The solar cell disclosed in the Bianchi patent includes a sapphire substrate, GaN TCC, and a GaAs solar cell on the TCC. In order to minimize lattice mismatch between the GaAs solar cell and the GaN TCC, corrective measures are taken. The corrective measures include a layer of indium gallium phosphide between the TCC and solar cell (col. 6, lines 55-59); a super lattice formed at the interface of the solar cell and TCC (col. 7, lines 7-11); a graded layer (col. 7, lines 22-24); and an offset method (col. 7, lines 22-29).

Iles discloses a multijunction solar cell having lattice-mismatched layers (Abstract, lines 1-2). Iles also describes corrective measures: a grading process to overcome a lattice mismatch in multi-layer coatings; and a parting layer so that the grown multi-junction cell can be released from the supporting substrate on which it is grown.

Iles discloses specific examples of solar cells[2], none of which use InGaN. Iles mentions gallium arsenide (GaAs), indium gallium phosphide (InGaP), aluminum gallium arsenide (AlGaAs), aluminum arsenide (AlAs), germanium (Ge), and indium gallium arsenide (InGaAs) to form buffer layers to alleviate lattice mismatch, create tunnel junctions as well as form higher bandgap junctions

Although Iles does mention an InGaN solar cell, it provides no details about growing it. It certainly doesn't provide the level of detail that it provides for the other examples of solar cells.

Wu describes InGaN solar cells, but offers no guidance for correcting the lattice mismatch. Wu is silent about covers for their InGaN solar cell. Wu is also silent about lattice mismatches with substrates upon which their solar cell is grown.

[2] See col. 7, lines 6-17; col. 10, lines 41-47; col. 12, lines 55-61; and col. 13,lines 43-49.

If anything, Wu provides clear evidence that the state of the art has not progressed to issues involved with making complete InGaN devices. Wu mentions problems with high-energy particle damage to InGaN solar cells, but offer no solutions. Wu states that "Work on InGaN has not yet progressed to the point of making complete devices, so we have chosen to study here basic material properties" (p. 6478, left column).

The cited documents, alone and in combination, do not offer guidance about growing an InGaN solar cell on a GaN TCC. In any event, the cited documents, alone and in combination, do not teach or suggest that a GaN TCC can provide a defect-free surface for growing an InGaN solar cell.

Page 6 of the office action asserts that Iles teaches "lattice mismatch problems are present and methods are needed for dealing with the lattice mismatch so tandem solar cells become even more efficient." However, Iles does not teach or suggest a GaN TCC provides a defect-free surface for growing an InGaN solar cell. Iles teaches a grading process and a parting layer.

Only the present application discloses that a GaN TCC provides a defect-free surface for growing an InGaN solar cell. This unexpected result provides real benefits. It allows an InGaN solar cell to be grown on the TCC/sapphire cover, thus forming a unitary assembly.

Therefore, the office action does not establish prima facie obviousness of base claim 25, which recites that GaN TCC provides a defect-free surface upon which the InGaN solar cell is grown. Accordingly, the '103 rejection of base claim 25 and its independent claims 5, 7-14 and 16 should be withdrawn.

The office action does not establish prima facie obviousness of base claim 1, which recites a transparent conductive coating formed on a GaN transparent substrate, which provides a defect-free surface for growing an InGaN solar cell.

Accordingly, the '103 rejection of claim 1 and its dependent claims should be withdrawn.

The office action does not establish prima facie obviousness of base claim 20, which recites growing a solar cell including a plurality of gallium indium nitride junction layers on a GaN transparent conductive coating without taking any measures to correct for lattice mismatch (regardless of whether Iles or Bianchi is cited as the primary reference). Iles is altogether silent about growing a solar cell on a TCC. Iles and Bianchi both suggest corrective measures for lattice mismatches, and Wu is silent about corrective measures. Accordingly, the '103 rejection of base claim 20 and its dependent claims should be withdrawn.

New claim 26

New claim recites that the TCC is formed as a plurality of quantum wells; and that the InGaN solar cell is in intimate contact with the GaN layer of the TCC. Support for new claim 26 is provided by Figure 2 and paragraph 21 of the application. The documents made of record do not teach or suggest this feature.

'112 Rejection

The office action indicates that claims 20-22 are rejected under 35 USC §112, first paragraph, as not complying with the written description requirement. The office action alleges that the specification does not provide support for the feature "growing a solar cell including a plurality of gallium indium nitride junction layers on the transparent conductive coating without taking any measures to correct for lattice mismatch." We respectfully disagree.

Paragraph 14 describes a plurality of GaInN junction layers 26 formed successively on a GaN TCC. Paragraph 21 states "If the TCC 24 has been formed as the plurality of quantum wells 36 (FIG. 2), a first layer of the plurality of GaInN junction layers 26 (or alternatively the GaN junction layer 32 if it is included in the assembly 20) is formed directly on the last GaN layer of the alternating layers 38 (FIG. 2) in intimate contact with the last GaN layer."

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. See, e.g., Moba, B.V. v. Diamond Automation, Inc., 325 F.3d 1306, 1319, 66 USPQ2d 1429, 1438 (Fed. Cir. 2003). The specification does not use the exact language of claim 20, but it does allow one to conclude that the specification describes growing a solar cell including a plurality of gallium indium nitride junction layers on the transparent conductive coating without taking any measures to correct for lattice mismatch. Therefore, the '112 rejection should be withdrawn.

The examiner is strongly encouraged to contact the undersigned to discuss any remaining issues before mailing another office action.

Respectfully submitted,

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